The development of the potential for low-cost, one-stop connecting services in Europe
– From ‘self-hubbing’ to reliable ‘low cost connecting services’?

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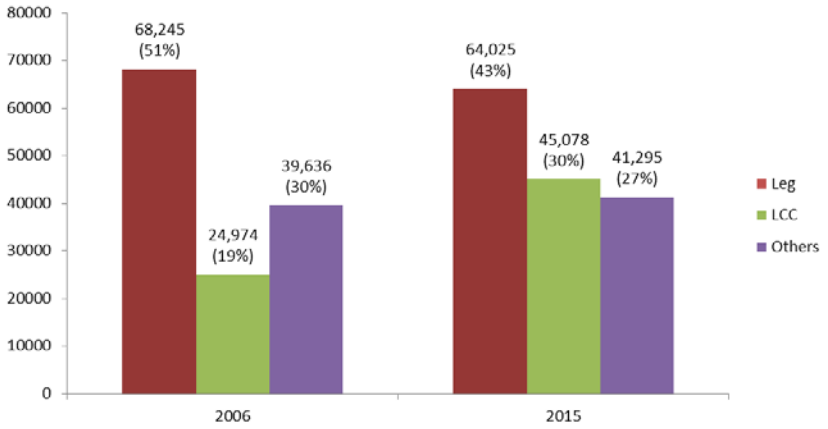
ATRS 2016 World Conference, Rhodes/Greece

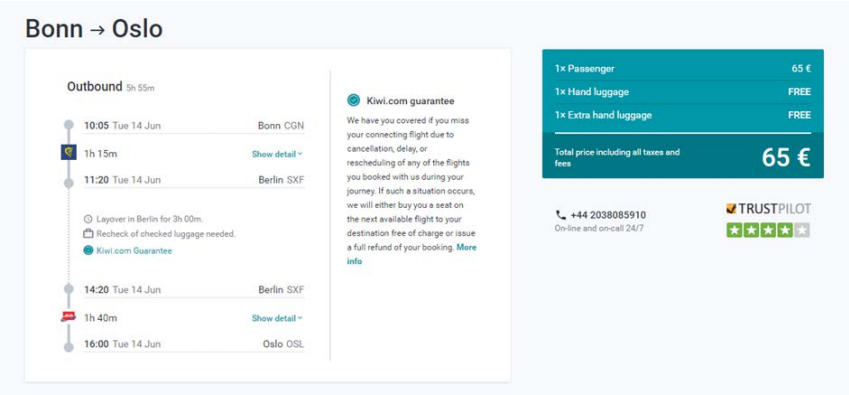
Background

- Growing European LCC network
  - 30% movement share (2015)
  - +11%-points since 2006
- Transfers between LCC flights still niche
- BUT: Self-hubbing and OTA-driven combination of flights
- BUT: Hybridisation trend: paradigm shift re. transfer flights (4U/EW, DY, VY + FR summer‘16 trial)
- **Hypothesis:** Big and growing potential for one-stop LCC connections if marketed accordingly

Europe: Weekly departures by carrier type - 2006 vs. 2015



KIWI.com CGN-SXF-OSL booking screenshot



Can we quantify this potential for LCC one-stop connections?

Previous research

- Malighetti et al. (2008)
  - 2/3 of the fastest indirect connections in Europe in 2007 not provided by the alliances
  - could be exploited by self-hubbing or innovative forms of carrier-independent transfer schemes

- Grimme (2008)
  - review of the first airport-led LCC transfer schemes (viaberlin.com…)
  - some benefits such as new city-pairs not served by FSNC and potential for more aviation and non-aviation revenues
  - two major obstacles for success: “unidirectionality” and “awareness” problems

Update from today‘s perspective needed

Research questions

- How many indirect (=one-stop) airport pairs and unique connections does the European LCC network provide? (today vs. 2006)

!!! One-stop = sufficient measure as 99.7% of all intra-EUR pax fly non- or one-stop (Sep 2015) !!!

Routing	Percentage
NON-STOP	93.1%
ONE-STOP	6.6%
THREE-STOP	0.0%
TWO-STOP	0.3%
Total	100%

- How does this compare to the scope of the network carriers?
- Which are the most important transfer airports and ODs for LCC one-stop flights?
- Which major organizational issues should be solved?

Definitions

- **Europe:** Geographical Europe as defined by IATA

Source: centraleuropehotels.eu

Low Cost Carriers

2006		2015	
FR	Ryanair Ltd.	FR	Ryanair Ltd.
U2	Easyjet Airline Company Limited	U2	Easyjet Airline Company Limited
AB	Air Berlin GmbH & Co. Luftverkehrs KG	VY	Vueling Airlines S.A.
BE	Jersey European Airways Limited dba FlyBE	DY	Norwegian Air Shuttle A.S
4U	Germanwings Gmbh	4U	Germanwings Gmbh
DE	Condor Flugdienst GmbH	W6	Wizz Air Hungary Ltd.
IG	Meridiana S.P.A.	EI	Aer Lingus Limited
WW	bmibaby Limited	HV	Transavia Airlines
X3	Hapag Lloyd Express Gmbh	LS	Jet2.com Limited
ZB	Monarch Airlines	ZB	Monarch Airlines
NB	Sterling Airlines A/S	DE	Condor Flugdienst GmbH
VY	Vueling Airlines S.A./Vueling Airlines	X3	Hapag Lloyd Express Gmbh
DY	Norwegian Air Shuttle A.S	IG	Meridiana fly S.P.A.
DS	Easyjet Switzerland S.A.	MT	Thomas Cook Airlines Limited of Manchester
LS	Jet2.com Limited	V7	Volotea, S.L.
HV	Transavia Airlines	TO	Transavia France
W6	Wizz Air Hungary	TB	TUI Airlines Belgium t/a Jetairfly
TV	Virgin Express	0B	Blue Air Transport Aerian/S.C. Blue Air Airline Management
NE	Skyeurope Airlines	QS	Travel Service A.S. (Smartwings)
8I	Myair	ST	Germania Fluggesellschaft mbH
VA	Volareweb.com	BV	Blue Panorama Airlines S.p.A
Y2	Globespan Airways Limited t/a Flyglobespan	D8	Norwegian Air International
HG	NIKI Luftfahrt GmBh	EW	Eurowings GmbH
5P	Sky Europe Airlines Hungary	HQ	Thomas Cook Airlines Belgium N.V.
		WW	Wow Air
		XG	SunExpress Deutschland GmbH

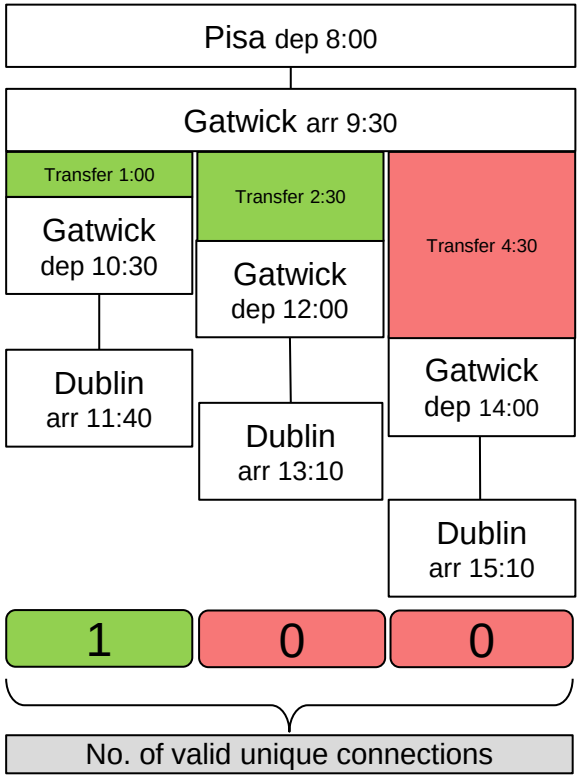
Network Carriers („Legacy“)

2006		2015	
LH	Deutsche Lufthansa AG	LH	Deutsche Lufthansa AG
AF	Air France	AF	Air France
IB	Iberia - Lineas Aereas de Espana	SK	Scandinavian Airlines System
SK	Scandinavian Airlines System	SU	Aeroflot Russian Airlines
BA	British Airways	BA	British Airways
AZ	Alitalia-Linee Aeree Italiane	AB	Air Berlin GmbH & Co. Luftverkehrs KG
KL	KLM Royal Dutch Airlines	AZ	Alitalia-Compagnia Aerea Italiana S.p.A
JK	Spanair S.A.	KL	KLM Royal Dutch Airlines
LX	SWISS International Air Lines Ltd. dba Swiss	IB	Iberia Lineas Aereas de Espana Sociedad Anonima Op
OS	Austrian Airlines, Osterreichische Luftverkehrs AG	LX	SWISS International Air Lines Ltd. dba Swiss
EI	Aer Lingus Limited	OS	Austrian Airlines AG dba Austrian
AY	Finnair Oyj	S7	Siberia Airlines
UX	Air Europa Lineas Aereas, S.A.	TP	TAP - Air Portugal/TAP Portugal
TP	TAP - Air Portugal	AY	Finnair Oyj
BD	British Midland Airways Ltd. dba bmi	A3	Aegean Airlines S.A.
SU	Aeroflot Russian Airlines	UX	Air Europa Lineas Aereas, S.A.
OK	Czech Airlines a.s., CSA	SN	Brussels Airlines N.V.
LO	LOT - Polish Airlines	LO	LOT - Polish Airlines
OU	Croatia Airlines	HG	NIKI Luftfahrt GmBh
XM	Alitalia Express/Australian Air Express Pty. Ltd.	RO	TAROM - Transporturile Aeriene Romane S.A.
JP	Adria Airways - The Airline of Slovenia	OU	Croatia Airlines
		OK	Czech Airlines a.s., CSA
		JP	Adria Airways - The Airline of Slovenia

Airline Logos taken from airline websitesd and wikipedia

Data and assumptions

- Data base: OAG (Official Airline Guide), 1-7 June, 2006/2015
- Consideration of unique one-stop connections and airport-pairs
- Free combination of flights within the LCC and FSNC groups
- Acceptable connecting time: 45min-4hrs
- Maximum detour factor: 150%
- ODs must be served in both directions
- First onward flight only



Methodology

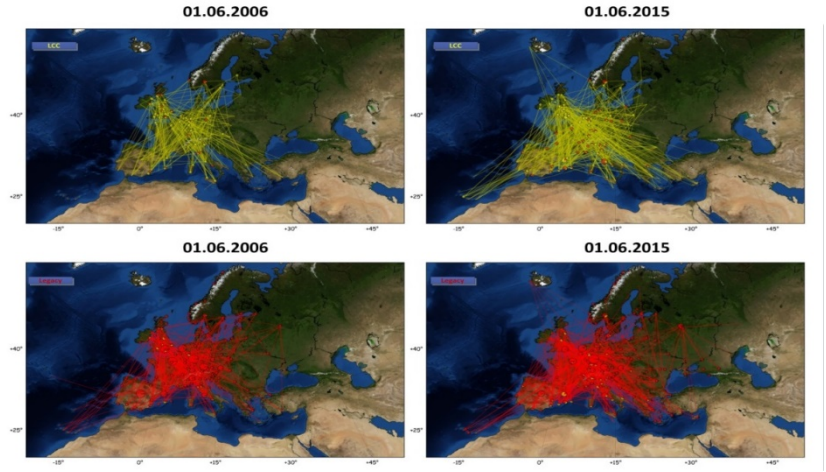
- Database approach: Multi-step filtering of the OAG data tables using sql
- OAG non-stop flight table is connected with itself via the “INNER JOIN” query (see picture): Arrival airport of table 1 = departure airport of table 2
- Resulting one-stop table contains all possible one-stop flights, restricted with regard to the pre-defined filters such as detour factor and layover timeframe
- Two separate tables for legacy carriers and LCC to reduce dataset size

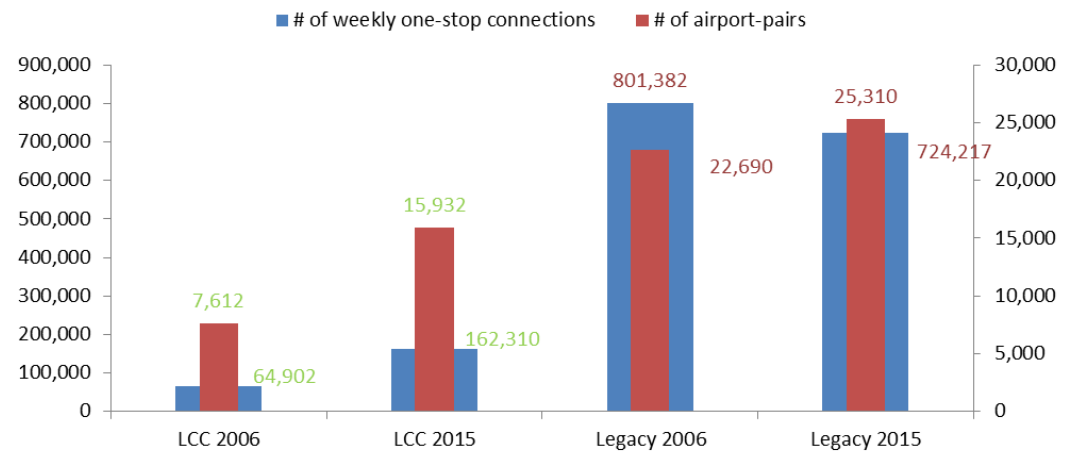
OAG_2015	
PK PK	**Dep** **Arr**
	AirlineType Frequency LocalDepDate LocalArrDate Distance ...

```
SELECT
        OAG1.Distance AS Leg1,
        OAG2.Distance AS Leg2,
        OAG1.DepAirport AS A1,
        OAG1.ArrAirport  AS A2,
        OAG2.ArrAirport  AS A3,
        distanz_oag.DStMiles AS ShortestLeg,
        OAG1.Distance + OAG2.Distance AS Leg,
        OAG1.AirlineType,
        OAG2.AirlineType
FROM  OAG_2015 AS OAG1
            INNER JOIN
                  OAG_2015 AS OAG2 ON
                        OAG1.ArrAirport = OAG2.DepAirport
            INNER JOIN
                  distanz_oag ON
                        OAG1.DepAirport = distanz_oag.DepAirport AND
                        OAG2.ArrAirport = distanz_oag.ArrAirport
WHERE     (OAG1.Distance + OAG2.Distance < distanz_oag.DStMiles * 1.5) AND
            (DATEDIFF(mi,  OAG1.LocalArrDate, OAG2.LocalDepDate) >= 45) AND
            (DATEDIFF(mi,  OAG1.LocalArrDate, OAG2.LocalDepDate) <= 240)
```

Results: Number of connections and airport pairs

- **Relevant LCC and Network carrier networks**





15,932 Airport Pairs (+19%)

LCC 2015 (vs. 2006)

162,310 Connections (+150%)

25,310 Airport Pairs (+11.5%)

Network Carrier 2015 (vs. 2006)

724,217 Connections (-9.6%)

Network carriers: much more unique connections but stagnating
Strongly growing OD potential by LCC
LCC and FSNC „almost same league“ at airport-pair level but average LCC frequencies still much lower

Results: Most important transfer airports

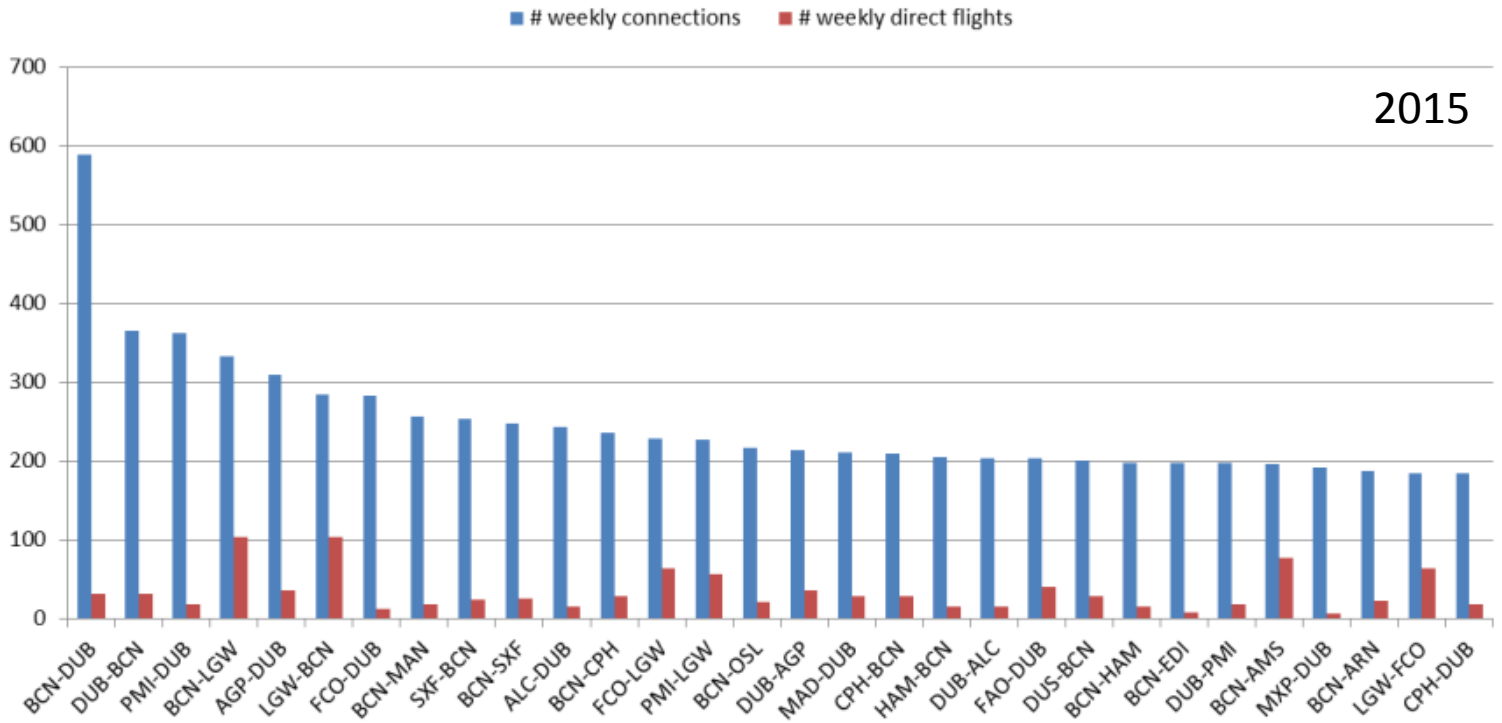
Largest LCC „hubs“
Barcelona
London LGW
London STN
Dublin
Oslo

Largest LCC Hubs 2015						Largest Legacy Hubs 2015					
Rank	LCC Rank	Hub	# Connections	share	cumulative	Rank	LEG Rank	Hub	# Connections	share	cumulative
10	1	BCN	27313	17%	17%	1	1	FRA	111066	15%	15%
12	2	LGW	20830	13%	30%	2	2	AMS	77589	11%	26%
19	3	STN	11745	7%	37%	3	3	MUC	70154	10%	36%
20	4	DUB	11165	7%	44%	4	4	CDG	55043	8%	43%
25	5	OSL	7533	5%	48%	5	5	MAD	42326	6%	49%
26	6	FCO	6435	4%	52%	6	6	LHR	38701	5%	55%
30	7	AMS	4544	3%	55%	7	7	VIE	34788	5%	59%
32	8	DUS	4358	3%	58%	8	8	FCO	34252	5%	64%
33	9	LTN	4171	3%	60%	9	9	ZRH	28817	4%	68%
34	10	PMI	4116	3%	63%	11	10	SVO	24662	3%	71%
38	11	MXP	3721	2%	65%	13	11	CPH	20805	3%	74%
40	12	BGY	3055	2%	67%	14	12	BRU	19133	3%	77%
42	13	CGN	2640	2%	69%	15	13	ARN	17738	2%	79%
43	14	GVA	2632	2%	70%	16	14	HEL	17377	2%	82%
44	15	CDG	2565	2%	72%	17	15	OSL	13598	2%	84%
45	16	CPH	2480	2%	74%	18	16	TXL	11806	2%	85%
46	17	MAN	2395	1%	75%	21	17	ATH	10424	1%	87%
47	18	MAD	2272	1%	76%	22	18	WAW	9423	1%	88%
48	19	STR	2212	1%	78%	23	19	DUS	8425	1%	89%
52	20	HAM	1925	1%	79%	24	20	PMI	7848	1%	90%
54	21	ARN	1771	1%	80%	27	21	LIN	5380	1%	91%
55	22	ORY	1709	1%	81%	28	22	LIS	5338	1%	92%

Largest FSNC „hubs“
Frankfurt
Amsterdam
Munich
Paris CDG
Madrid

Higher “hub” concentration in FSNC network: 80% of all one-stop connections via 13 transfer airports (vs. 21 airports in the LCC network)
Biggest low cost and network carrier “hubs” not identical.

Results: Most important airport pairs (LCC, 2015)



Each of today's TOP30 one-stop low cost ODs is served by at least one weekly direct flight.

Conclusion and further issues (1)

- We count **162,000 weekly, unique one-stop** connections within the European LCC network - +150% compared to 2006 but still below the almost 725,000 connections offered by the FSNC. **This gap was much smaller if only online and codeshare connections were counted within the FSNC group.**

- At the **airport pair** level, though, the LCC sector already provides a choice that comes relatively close to the legacy carriers (15,900 vs. 25,300 airport pairs)

- Many stakeholders as potential benefitors
  - Passengers: more choice, more competition, lower fares
  - Airlines: Higher economies of density
  - Transfer airports: higher revenues

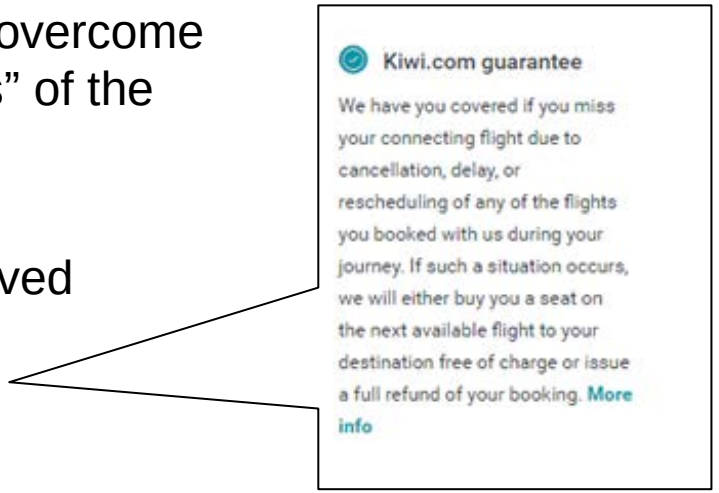
- The identified, growing potential for LCC one-stop connections in Europe will however only bring a benefit for the stakeholders if eventually translated into actual bookings and passenger flows.

Conclusion and further issues (2)

- **Higher “hub” concentration in the FSNC network**: Operational facilities to improve connections between LCC would have to be implemented at a larger number of airports.

- **Most of the leading LCC transfer airports are not identical with the established hubs:** Easier to invest in transfer facilities as the concerns of the network carriers won’t have to be taken into account?
-
- **Globally known booking platforms** may help overcome the ‘unidirectionality” and “awareness” problems” of the early, airport-specific schemes.

- The **missed connection risk** may easily be solved by **insurance solutions**.



Conclusion and further issues (3)

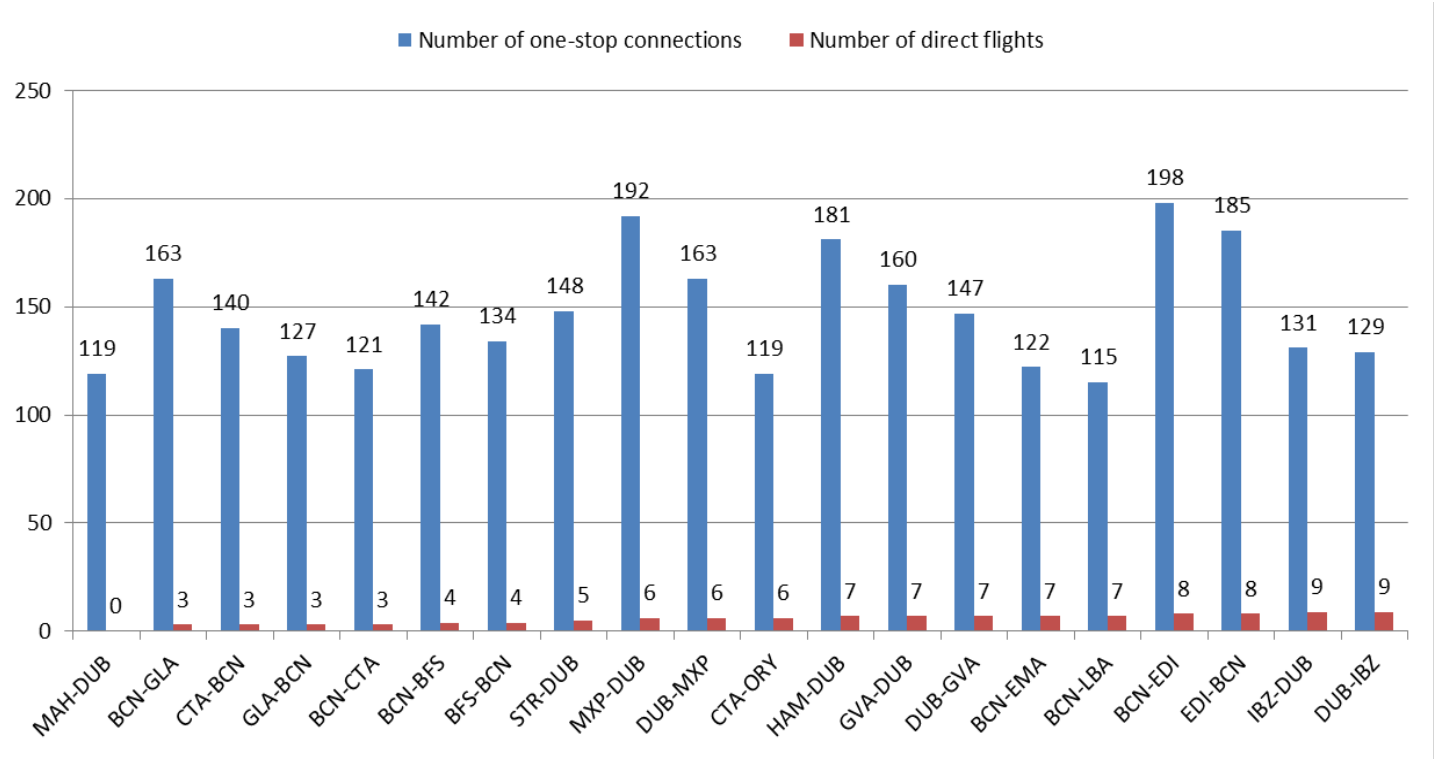
- **Biggest remaining issues**
  - Baggage through-checking / software issues
  - Achieving competitive minimum connecting times

- DUS Airport example: Pathway between terminal sections A-B-C, allowing for connections between all different airlines

Airlines, airports and ground processes/IT solutions will have to leave well-worn paths!!

THANK YOU!

Results: Most important LCC one-stop airport pairs competed by less than 10 weekly direct flights



Especially those routes with high one-stop supply but low numbers of direct flights might provide good business opportunities for one-stop offerings.

Base: 100 largest one-stop airport pairs, 2015 (routes with most LCC one-stop connections)